

WHAT IS CLAIMED IS:

1. A programmable system for monitoring electricity consumption by a residence or business, the system comprising:
 - (a) a Measuring Transmitting Unit integrated in a main circuit breaker or utility meter in the residence or business; comprising: (1) a means of receiving AC analog signals, converting the AC analog signals to DC analog signals, summing the DC analog signals, and outputting the information; (2) a microcontroller; (3) a power line carrier transmission interface controller; and (4) a power supply for powering the Measuring Transmitting Unit; and
 - (b) a programmable Receiving Display Unit, comprising: (1) a power supply for powering the Receiving Display Unit; (2) a power plug; (3) a power line carrier transmission interface controller; (4) a data decoder; (5) a microcontroller; (6) memory associated with the microcontroller; (7) a visual display; and (8) a mechanism for inputting to the Receiving Display Unit; and

wherein the Measuring Transmitting Unit translates current flowing in main service power circuit conductors to digitally encoded signals, and transmits the digitally encoded signals over existing power circuits in the residence or business; and

wherein the Receiving Display Unit receives the digitally encoded signals being emitted by the Measuring Transmitting Unit, decodes the digitally encoded signals, and translates them to the visual display for viewing.
2. A system according to Claim 1, which system is not connected to a current transformer.
3. A system according to Claim 1, wherein the means of receiving AC analog signals, converting the AC analog signals to DC analog signals, summing the DC analog signals, and outputting the information, is at least two amplifiers.

4. A system according to Claim 3, wherein the Measuring Transmitting Unit further comprises two or three burden resistors for converting a current signal to a voltage signal.

5. A system according to Claim 1, wherein the Measuring Transmitting Unit and at least two current sensing modules are an integral part of a main circuit breaker unit within the circuit breaker panel.

6. A system according to Claim 5, wherein the main circuit breaker unit comprises an on-off switch, and a voltage sensing and transmitting Measuring Transmitting Unit linked to the at least two current sensing modules within the main circuit breaker unit.

7. A system according to Claim 2, wherein the mechanism for inputting to the Receiving Display Unit is at least one input or mode button on a face of the Receiving Display Unit.

8. A system according to Claim 1, wherein the Receiving Display Unit is linked with a personal computer by a connection through a Receiving Display Unit interface.

9. A system according to Claim 8, wherein the Receiving Display Unit further comprises a digital clock with battery back-up, and a protective cover for enclosing the Receiving Display Unit.

10. A system according to Claim 8, wherein the Receiving Display Unit is connected to a Personal Digital Assistant through a serial, USB, or firewire connection.

11. A system according to Claim 10, wherein the Receiving Display Unit comprises RAM or EEPROM memory for manipulating and storing data, and PROM or EPROM memory for storing a software program.

12. A system according to Claim 11, wherein the Receiving Display Unit further comprises a means for transmitting coded signals back through the power circuits in the residence or business for information transmission and load shedding.

13. A system according to Claim 12, wherein the visual display is a liquid crystal display.

14. A system according to Claim 13, wherein the Receiving Display Unit further comprises a visual or audible alarm, and wherein the liquid crystal display is lighted.

15. A system according to Claim 14, wherein the power plug transmits electrical power for the power supply of the Receiving Display Unit, as well as a reference signal for timing power line carrier transmissions.

16. A system according to Claim 1, wherein the Receiving Display Unit is linked to a personal computer through a power line technology connection (PLTC)-to-computer interface converter; the PLTC-to-computer interface converter being linked to the personal computer; the PLTC-to-computer interface converter being plugged into a second AC receptacle; the Receiving Display Unit being linked by a power line carrier technology connection to the PLTC-to-computer Interface converter.

17. A system according to Claim 9, wherein the Receiving Display Unit is linked to a Personal Digital Assistant through a power line technology connection (PLTC)-to-computer Interface converter; the PLTC-to-computer interface converter being linked to the Personal Digital Assistant by a serial, USB, or firewire connection; the PLTC-to-computer interface converter being plugged into a second AC receptacle; the Receiving Display Unit being linked by a power line technology connection to the PLTC-to-computer Interface converter.

18. A system according to Claim 17, wherein the PLTC-to-computer interface converter comprises a serial, USB, or firewire connector connected to a microprocessor; the microprocessor being connected to a power line technology connection chip; the power line technology connection chip being linked to a power plug on an opposite face of the PLTC-to-computer interface converter.

19. A system according to Claim 18, wherein the power line technology connection (PLTC)-to-computer interface converter comprises a serial, USB, or firewire connector connected to a smart chip; the smart chip being connected to a power line technology connection chip; the power line technology connection chip being connected to a power plug on the PLTC-to-computer interface converter.

20. A system according to Claim 8, wherein the Receiving Display Unit is linkable by a power line technology connection to at least one load shedding device; the at least one load shedding device controlling at least one electrical appliance in the residence or business.

21. A system according to Claim 20, wherein the Receiving Display Unit is linked to a personal computer by a serial, USB, or firewire connection.

22. A system according to Claim 20, wherein the Receiving Display Unit is linked to a Personal Digital Assistant by a serial, USB, or firewire connection.

23. A system according to Claim 1, wherein the Receiving Display Unit is linked to a land telephone line for automatic reception of information via a telephone.

24. A system according to Claim 1, wherein the Receiving Display Unit further comprises an interface for receiving wireless telephone transmissions.

25. A system according to Claim 1, wherein the Receiving Display Unit further comprises an interface for receiving paging signals from a pager.

26. A system according to Claim 9, wherein data is received from the utility via existing transmission lines through the utility meter of the residence or business; the data passing via power line technology connection to the Receiving Display Unit.

27. A system according to Claim 8, wherein the Receiving Display Unit receives data via the Internet on the personal computer.

28. A method for monitoring electricity consumption by a residence or business, the method comprising the following steps:

(a) measuring current in main service power conductors, and converting the measurements to digital signals;

(b) encoding the digital signals and transmitting them over existing power lines in the residence or business using power line carrier technology;

(c) receiving the encoded digital signals from the power lines, decoding the encoded digital signals, and converting the decoded digital signals to power measurements;

- (d) periodically receiving signals from a utility;
- (e) storing the measurements and utility signal information in memory;

and

- (f) displaying the information for viewing.

29. A method according to Claim 28, further comprising the step of sounding an audio or visual alarm at a pre-set electricity consumption level.

30. A method according to Claim 28, further comprising the step of load shedding at a pre-set electricity consumption level.

31. A method according to Claim 28, wherein steps (a) and (b) are conducted in a Measuring Transmitting Unit of a programmable electricity consumption system, and steps (c) through (f) are conducted in a Receiving Display Unit of the system.

32. A method according to Claim 31, wherein, in step (d), the Receiving Display Unit further comprises an interface for receiving paging signals from a pager, and the signals from the utility are received via the pager.

36. A method according to Claim 31, wherein the Receiving Display Unit is linked with a personal computer by a connection through a Receiving Display Unit interface, and the Receiving Display Unit receives data via the Internet on the personal computer.

34. A method according to Claim 28, wherein the signals from the utility are via a land line telephone or a cellular telephone.

35. A method according to Claim 28, wherein the signals from the utility are received via power line technology connection.